Schwank
INNOVATIVE HEATING SOLUTIONS

infrasave
radiant heaters

Model 2300 Model IO-210

Patio Heater for Outdoor Application
and Gas-Fired Luminous (High Intensity) Infrared Heater
for Commercial / Industrial Non-Residential Indoor Spaces

INSTALLATION / OWNER'S MANUAL

WARNING Improper installation, adjustment, alteration, service or maintenance can cause property damage, injury or death.

Read the installation and operating and maintenance instructions thoroughly before installing or servicing this equipment.

SAFETY ALERT:

This heater must be installed and serviced only by a trained gas service technician. Failure to comply could result in personal injury, death, fire and/ or property damage.

Do not store or use gasoline or other flammable vapours and liquids in the vicinity of this or any other gas fired appliance.

This heater is not approved for indoor residential application.

IF YOU SMELL GAS:

- Extinguish any open flame
- Do not attempt to light this or any other appliance
- Don't touch any electrical switch, or telephone
- Immediately leave the area and call your gas supplier from a neighbor's phone
- Follow any and all instruction from your gas supplier
- If your gas supplier is not available, call the fire department

FIELD CONVERTIBILITY: This appliance is field convertible to LP gas. Use kit available from manufacturer. Follow all local and national codes.

INSTALLER: PRESENT THIS MANUAL TO THE END USER.

Keep this manual in a secure place .

Record for future reference:

Model #: _____

Serial #: _____

(located on heater rating label)

CERTIFIED ® DESIGN CERTIFIED ®

2300 / IO 210 Manual
IM110107
RD: AUG 2011
R.L. 12B
BA

NOTICE:

The manufacturer reserves the right to make changes to equipment and specifications without obligation or notification.

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Models 2300 / IO-210

Patio Heater for Outdoor Application and Gas-Fired Luminous (High Intensity) Infrared Heater for Commercial / Industrial Non-Residential Indoor Spaces

TABLE OF CONTENTS

TOPIC PAGE NUMBER

IMPORTANT INFORMATION - READ FIRST

IMPORTANT WARNINGS 4
HEATER EXPANSION 5
GAS CONNECTION 5
VENTING 5, 13
'SMOKE' & DISCOLORATION 5
CLEARANCE TO COMBUSTIBLES 6
Clearances Figure & Table 7
MOUNTING LOCATIONS 8

1. APPLICATION 9
   OUTDOOR / PATIO 9
   INDOOR INSTALLATION 9
2. AIRCRAFT HANGARS 10
3. GARAGES & PARKING STRUCTURES 10
4. OTHER THAN SPACE HEATING 10
5. PRE-INSTALLATION SURVEY 10
6. INSTALLATION REQUIREMENTS 11
   6.1 MOUNTING CLEARANCES 11
   6.2 HEATER MOUNTING 11
7. GAS SUPPLY PIPING 12
   7.1 GAS PRESSURE 12

TOPIC PAGE NUMBER

8. ELECTRICAL - BASIC REQUIREMENTS 12
9. INSTALLATION PROCEDURES 13
10. LIGHTING INSTRUCTIONS 14
    10.1 SHUT DOWN INSTRUCTIONS 14
11. HEATER FINISH & APPEARANCE 14
12. SERVICING GUIDE 15
13. VENTILATION FOR INDOOR APP'S 17
14. DIMENSIONS & CONFIGURATION 18
15. MOUNTING KIT OPTIONS 18
16. ELECTRICAL REQUIREMENTS 23
    16.1 REMOTE CONTROL OPTION 23
17. SEQUENCE OF OPERATION-FENWAL 35-60 DSI 23
18. SPARK IGNITION CIRCUIT 25
19. WIRING DIAGRAM 26
20. TROUBLESHOOTING GUIDE 27
21. COMMISSIONING REPORT 29
22. REPLACEMENT PARTS LIST 31
23. LIMITED WARRANTY 32

IMPORTANT

Installer: Present this manual to the end user. Acquaint the end user with Important Information: Cover & pages 4 to 7.

END USER: In particular you must be aware of 'Clearances to Combustible' requirements and the limitations of stacking or placing material near the heaters.

Inform your safety personnel and staff of this information.

WARNING

Improper installation, adjustment, alteration, service or maintenance can cause property damage, injury or death. Read and understand this installation and operation manual thoroughly prior to assembly, installation, operation or service to this appliance.

This heater must be installed and serviced only by a trained gas service technician.

Do not store or use gasoline or other flammable vapours and liquids in the vicinity of this or any other gas fired appliance.

Failure to comply to these warnings could result in personal injury, death, fire and/or property damage.

This appliance may have sharp edges and corners. Wear protective clothing such as gloves and protective eye wear when servicing this or any other appliance.

WARNING

Due to the effects of radiant heat upon certain materials it is not recommended to store or place items that could be damaged or distorted, directly under this heater....i.e. combustible patio furniture etc.

- Clothing or other flammable materials should not be hung from, or placed near to the heater
- Children and Adults should be alerted to the hazards of high surface temperatures and should be careful to avoid burns or clothing ignition
- Young children should be carefully supervised when in the area of a heater

WARNING

This heater is not for installation in a Class 1 or Class 2 explosive environment, nor for any residential application. If installation of this equipment is in question, consult with local authorities having jurisdiction (Fire Marshal, labor department, insurance underwriter, or others).

Revisions to codes and/or standards, may require revision to equipment and installation procedures. In case of discrepancy, the latest codes, standards, and installation manual will take priority over prior releases.

IMPORTANT: DO NOT INSTALL THIS HEATER INDOORS IN A STRUCTURE WITH NO INSULATION IN THE ROOF—CONDENSATION WILL OCCUR.

WARNING Heater Expansion

It is a normal condition that during heat-up and cool-down a radiant heater will expand and contract. Allowances for heater expansion must be made in the gas connection and heater suspension. Improper installation, alteration, or adjustment can result in property damage, injury or death.

WARNING Gas Connection

Improper installation, connection, or adjustment can result in property damage, toxic gases, asphyxiation, injury or death. Use an approved stainless steel flexible gas connector (field supplied) to connect to the gas supply to the heater in accordance with all local, state, provincial, and national codes (ANSI Z223.1/NFPA 54 in USA; B149.1 in Canada) and as indicated in this manual.

WARNING Venting

Inadequate venting of a heater may result in asphyxiation, carbon monoxide poisoning, injury or death. When used indoors, this heater is indirectly vented from the space. Venting must be in accordance with all local, state, provincial, and national codes (ANSI Z223.1/NFPA 54 in USA; B149.1 in Canada) and as indicated in this manual. **Refer to Section 13**

WARNING Start-up 'Smoke' & Discoloration Condition

During start-up, the heating of material coatings used in the production process of the heater may create a small amount of smoke during the initial period of operation. This condition is normal and temporary .

Ensure that there is sufficient ventilation to adequately clear any 'smoke' from the space.

Notify site management and safety personnel to ensure that alarm systems are not unduly activated.

Under certain conditions in some locations/environments, surface discoloration may occur on the heater body where the products of combustion discharge from the heater. **The discoloration is due to the deposit of ambient air borne particulate or gases within the space that have passed through combustion. The combustion of fuel gas in a clean environment will not cause any discoloration. Surface discoloration does not affect the operation or performance of the heater nor the manufacturer's warranties.**

WARNING Clearance to Combustibles

Location of flammable or explosive objects, liquids or vapors close to the heater may cause fire or explosion and result in property damage, injury or death. Do not use, store or locate flammable or explosive objects, liquids or vapors in proximity of the heater.

The clearance to combustible material represents the minimum distance that must be maintained between the outer heater surface and a nearby surface. The stated clearance to combustibles represents a surface temperature of 90F° (50C°) above room temperature.

<u>It is the installer's responsibility to ensure that building materials with a low heat tolerance which may degrade at lower temperatures are protected to prevent degradation</u>. Examples of low heat tolerance materials include vinyl siding, fabrics, some plastics, filmy materials, etc.

In locations used for the storage of combustible materials, signs must be posted to specify the maximum permissible stacking height to maintain the required clearances from the heater to the combustibles. For your convenience, a sign is supplied with this heater - see page 8 for details. Such signs must either be posted adjacent to the heater thermostats or in the absence of such thermostats in a conspicuous location.

In addition to stored or stationary material, consideration must also be given to moveable objects such as cranes, vehicles, and overhead doors, and structural objects such as electrical and gas lines, electrical fixtures, and sprinkler heads.

Heaters must be located an appropriate distance from sprinkler heads. This distance may be greater than the certified clearance to combustibles. Check the temperature rating of the sprinkler heads and locate heaters at a safe distance - in some instances the sprinkler heads may need to be replaced by higher temperature heads.

It is beyond the scope of these instructions to consider all conditions that may be encountered. Consult local authorities such as the Fire Marshall, insurance carrier, or safety authorities if you are uncertain as to the safety or applicability of the proposed installation.

Refer to Figure 1 and Table 1 NEXT PAGE for the certified clearances to combustibles for the appropriate model input/size.

Table 1: MINIMUM CLEARANCES TO COMBUSTIBLES

Application	MODEL NO	Ends	Below	Horizontal		30° Angle		
		C	B	D	E	F	G	H
OUTDOOR	2312 / IO 212 -N\L	3”	48”	5.5”	7”	9.5”	1”	9.5”
OUTDOOR	2313 / IO 213 -N\L	5”	48”	7.5”	9”	9.5”	1.5”	21”
OUTDOOR	2315 / IO 215 -N\L	16”	60”	8”	13.5”	10”	2”	21”
INDOOR	2312 / IO 212 -N\L	4”	60”	8”	10”	12.5”	2.5”	14”
INDOOR	2313 / IO 213 -N\L	6”	60”	10.5”	14.5”	14.5”	2.5”	26”
INDOOR	2315 / IO 215 -N\L	17”	78”	11”	19”	16.5”	3”	28.5”

The clearance to combustible material represents the minimum distance that must be maintained between the outer heater surface and a nearby surface. The stated clearance to combustibles represents a surface temperature of: Indoor = 90F° (50C°) above room temperature; Outdoor = 117F° (65C°) above ambient temperature.

It is the installer’s responsibility to ensure that building materials with a low heat tolerance which may degrade at lower temperatures are protected to prevent degradation. Examples of low heat tolerance materials include awnings, vinyl siding, fabrics, some plastics, filmy materials, etc.

Figure 1: MOUNTING CLEARANCES

Note: Do not store or place anything directly under heater

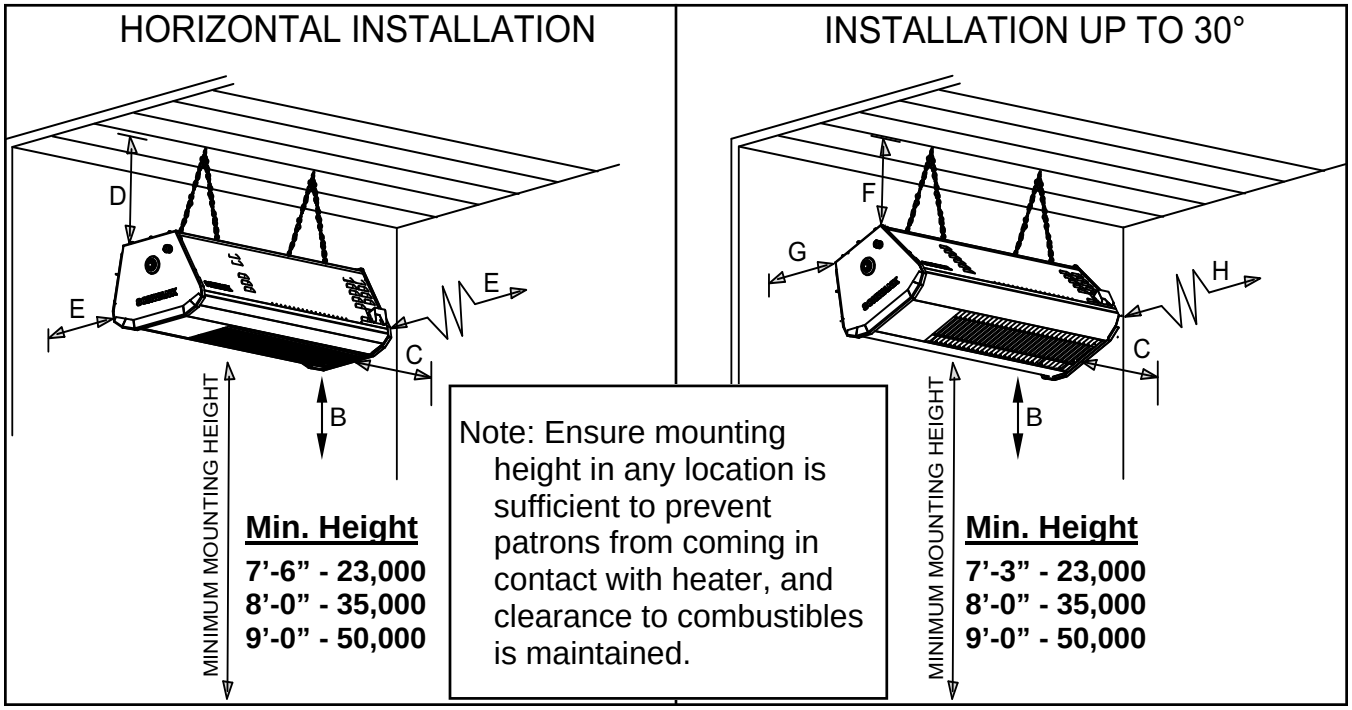
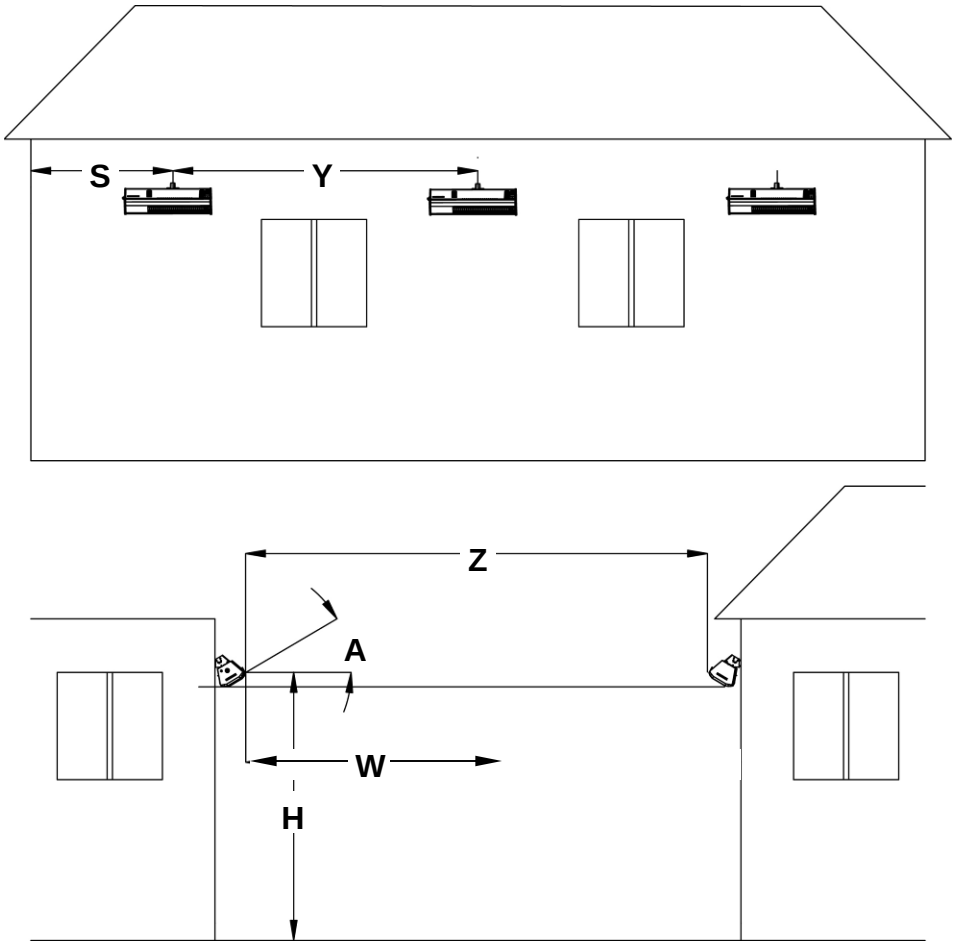


Table 2: SUGGESTED MOUNTING DISTANCES FOR COMFORT

MOUNTING PARAMETERS ***	MODEL 2312 / IO 212 23,000 Btuh		MODEL 2313 / IO 213 35,000 Btuh		MODEL 2315 / IO 215 50,000 Btuh	
A- Mounting angle	**Horizontal**	**30^0**	**Horizontal**	**30^0**	**Horizontal**	**30^0**
H- Suggested mounting height to patio floor	8’ 0”	8’ 0”	8’ 6”	8’ 6”	9’6”	9’ 6”
S- Side distance to patio edge	3’ 6”	3’ 6”	4’ 0”	4’ 0”	5’ 0”	5’ 0”
Y- Side distance between heaters	6’ 0”	6’ 0”	8’ 0”	8’ 0”	10’ 0”	10’ 0”
W- Distance effective coverage	6’ 0”	7’ 0”	7’ 0”	8’ 0”	8’ 0”	9’ 0”
Z– Front distance between heaters	12’ 0”	14’ 0”	14’ 0”	16’ 0”	16’ 0”	18’ 0”

Figure 2: MOUNTING PARAMETER DISTANCES



*** Note: Mounting angles and distances are suggested to ensure comfort, and are subject to site and design conditions.

If in doubt, please contact your Schwank distributor.

Ensure mounting height in any location is sufficient to prevent patio patrons from coming in contact with the heater

1. APPLICATION

These installation instructions are applicable to Model 2300 / IO 210 Heaters. This gas-fired infrared heater is suitable for installation for heating of outdoor commercial / industrial / residential areas and indoor commercial / industrial / non-residential spaces.

It is beyond the scope of these instructions to consider all conditions that may be encountered. Installation in the USA must conform to all local and national code requirements including the current National Fuel Gas code ANSI Z223.1, and the National Electrical Code ANSI/NFPA No 70 (latest edition). All installations in Canada must conform to local and national code requirements including, CAN/CGA-B149.1 installation code for gas burning appliances and equipment and the Canadian Electrical Code PART 1 CSA C22.1 (latest edition). In case of discrepancy due to revisions to standards and codes, the latest standards, codes, and installation manual are in effect and take priority.

OUTDOOR / PATIO Installation:

This heater is certified for use on outdoor patio's in accordance with ANSI Z83.26 / CSA 2.37
Schwank warrants that the heater will operate as designed in mild wind conditions up to 10 MPH. Note this unit is not designed to operate in adverse weather conditions including higher wind speeds exceeding the certification requirement of 10 MPH.

What is "Outdoor"?:

An appliance approved for "outdoor use" may be installed with shelter no more inclusive than:

- With walls on all sides, but with no overhead cover, (overhead permanently open) *or*
- Within a partial enclosure which includes an overhead cover and no more than two side walls. These side walls may be parallel, as in a breezeway, or at right angle to each other. The open sides must be permanently open *or*
- Within a partial enclosure which includes an overhead cover and three side walls, as long as 30 percent or more of the horizontal periphery of the enclosure is permanently open.

If these "outdoor" conditions are not met, the appliance is approved for "indoor use" and ventilation requirements of local codes apply. See "Indoor Application" below.

INDOOR Installation:

This heater is certified for space or spot heating of commercial / industrial non-residential indoor spaces in accordance with ANSI Z83.19b / CSA 2.35b.

WARNING

Inadequate venting of a heater may result in asphyxiation, carbon monoxide poisoning, injury or death. Heating system venting must be in accordance with all local, state, provincial, and national codes (ANSI Z223.1/NFPA 54 in USA; B149.1 in Canada).

INDOOR INSTALLATION IN A STRUCTURE THAT HAS NO INSULATION IN THE ROOF CAN RESULT IN THE FORMATION OF CONDENSATION ON COLD SURFACES.

2. INSTALLATION IN COMMERCIAL AIRCRAFT HANGARS

Luminous (high intensity) radiant tube heaters are suitable for use in aircraft hangars when installed in accordance with the latest edition of the Standard for *Aircraft Hangars*, ANSI/NFPA No 409 in the USA, or the Canadian *Natural Gas and Propane Installation Code*, B149.1.

A. A minimum clearance of 10 ft (3 m) above either the highest fuel storage compartment or the highest engine enclosure of the highest aircraft which may occupy the hangar. The clearance to the bottom of the heater shall be measured from the upper surface of either the fuel storage compartment or the engine enclosure, whichever is higher from the floor.

B. A minimum clearance of 8 ft (2.4 m) must be maintained from the bottom of the heater to the floor in other sections of the aircraft hangar, such as offices and shops, which communicate with areas for servicing or storage. Refer to Table 1 for proper mounting clearances to combustibles.

C. Heaters must be located so as to be protected from damage by aircraft and other objects, such as cranes and movable scaffolding.

D.Heaters must be located so as to be accessible for servicing and adjustment.

3. INSTALLATION IN COMMERCIAL GARAGES AND PARKING STRUCTURES

Luminous (high intensity) radiant heaters are suitable for use in commercial garages when installed in accordance with the latest edition of the Standard for *Parking Structures*, ANSI/NFPA 88A, or the Standard for *Repair Garages*, ANSI/NFPA No. 88B, or the Canadian *Natural Gas and Propane Installation Code*, B149.1.

WARNING An overhead heater shall be located to maintain the minimum distance to combustibles, as shown on the heater rating plate, from the heater to any vehicles parked below the heater.

Overhead heaters shall be installed at least 8 ft (2.4 m) above the floor.

4. INSTALLATIONS OTHER THAN SPACE HEATING

Use for process or other applications that are not space heating will void the C.S.A. certification and product warranty. Process application requires field inspection and/or certification by local authorities having jurisdiction. Process application design should be provided by local experienced process design experts.

5. PRE INSTALLATION SURVEY

It is recommended that a full heating design including heat loss calculation be conducted on the structure or area to be heated. Heater sizing and placement must consider available mounting height, sources of greatest heat loss, and obstructions on the site. The certified clear-

ances to combustibles with respect to stored material, moveable objects (cranes, vehicles, lifts, overhead doors, etc), structural components, and sprinkler system heads. Consideration must also be given to ventilation fan placement (outdoor heaters do not require ventilation). Carefully survey the area to be heated, and for best results place heaters in the coldest area (s) and at sufficient spacing to provide uniform radiant heat coverage.

Installation must conform with all local, state, provincial and national code requirements including the current latest edition ANSI Z223.1 (NFPA 54) in the U.S.A. and B149.1 installation code in Canada, for gas burning appliances and equipment. The latest edition Electrical Code ANSI/NFPA N0 70 in the U.S.A. and PART 1 CSA C22.1 in Canada must also be observed.

The heating system must have gas piping of the correct diameter, length, and arrangement to provide for and satisfy the total system input. A layout drawing is necessary to calculate properly sized gas supply piping.

6. INSTALLATION REQUIREMENTS

6.1 MOUNTING CLEARANCES

Series 2300 / IO 210 Heaters must be mounted with minimum clearances to combustible materials. Refer to the introductory section “Clearance to Combustibles” page 6 and to Table 1 and Figure 1 page 7.

THIS HEATER HAS HOT SURFACES: Minimum mounting height is to be no less than 87” above the floor / deck. Do not locate heater where patrons can come into contact with heater. Do not store or place items directly underneath heater. Maintain clearance to combustibles.

The heater must be located with respect to building construction and equipment so as to provide sufficient clearance and accessibility for servicing of burner and ignition control and cleaning . Provide adequate clearance around air openings into the combustion chamber.

6.2 HEATER MOUNTING

Refer to Table 2 and Figure 2. Series 2300 / IO 210 Heaters are approved for both horizontal and angle mounting on the short axis. Schwank recommends a maximum 30° mounting angle in most applications - if the short axis is rotated to an angle exceeding 30°; a large portion of infrared heat may be directed above the heads of seated occupants in many applications. Improper angle mounting can result in damage to the heater or unsafe operation, and will void warranty.

IMPORTANT: *For either horizontal or angle mounting, the long axis of the heater must be level. Use only non-combustible mounting hardware. Diagram 2 on Page 5 illustrates typical suspension hardware that may be used., and provided by Schwank as an optional component.*

7. GAS SUPPLY PIPING

- All piping must be installed according to local codes.
- An approved flexible connector between the heater and gas piping must be installed. This field supplied item is available as an option from Schwank.
- A drip-pocket at the inlet connection must be provided.
- Provide a 1/8" NPT plugged tapping, accessible for test gage connection, immediately up-stream of the gas supply connection to the heater.
- On propane-fired units, a main line filter is recommended (field supplied).
- Piping joint compounds must be resistant to the action of liquefied petroleum gases.
- All piping joints must be tested for leaks with a soap and water solution.

7.1 GAS PRESSURE

The maximum supply pressure must be limited to 14"w.c. (0.5 psi). If the line pressure is above 14"w.c., then a separate pressure reducing regulator must be installed. The minimum pressure at the inlet to the heater regulator must be equal to or greater than 6.0"w.c. for natural gas and 11.0"w.c. for propane gas.

CAUTION: *DO NOT INSTALL ANY GAS PIPING IN HEAT ZONES.*

Proper manifold pressure must be established during commissioning, and will be maintained when the main burner is operating under the following supply pressure:

Table 3

	LINE PRESSURE "w.c.		MANIFOLD PRESSURE "w.c.
	MINIMUM	MAXIMUM	AT GAS VALVE TEST POINT
NATURAL GAS	6.0	14.0	5.0
PROPANE GAS	11.0	14.0	10.0

Natural Gas: Orifice sized for 1000 BTU/CU.FT.
Propane Gas: Orifice sized for 2500 BTU/CU.FT.

8. BASIC ELECTRICAL REQUIREMENTS - see also Section 14 page 22

All electrical installations must meet local codes and the latest edition ANSI/NFPA N0 70 in the U.S.A. and Electrical Code PART 1 CSA C22.1 in Canada .

TRANSFORMER SPECIFICATIONS (field supplied)

Single heater requires 24 Volt, 60 Hz electrical transformer sized at 40 VA.

Multiple heaters in a zone are powered by a single transformer (field supplied). The proper transformer is 24 Volt AC, 60 Hz, sized at 40VA for the first heater plus 20VA for each additional heater in the zone - round up the calculated value to the next higher available sized transformer. For example, four heaters in a zone require a transformer of : 1 x 40VA + 3 x 20 VA = 100 VA . It is not recommended to install more than 12 heaters per zone.

PROPER WIRING POLARITY MUST BE MAINTAINED, particularly when grouping the heaters in a zone. Total wiring distances of up to 200' must use minimum 16 gauge electrical wire, and wiring distances of over 200' must use minimum 14 gauge electrical wire. The heater must be electrically grounded in accordance with local and national electrical codes. Malfunction of the heating system will result if the voltage varies by more than ±10% .

The heater can be controlled by a line voltage thermostat, a 24 volt thermostat or “off-on” switch. Total load of all heaters must be considered in determining the required contact rating of the controlling thermostat or switch.

9. INSTALLATION PROCEDURES

a) Properly install gas line to all local codes

b) Mount heaters using non-combustible mounting hardware

c) Observe all minimum clearances as indicated in Table 1 and Figure 1

d) Suggested mounting distances for comfort in Table 2 and Figure 2 are guidelines based on experience. Site conditions can allow for some deviation from these distances.

WARNING: *When using Wall Mounting Bracket JP-2300-MB, or Arm Mounting Bracket JP-2300-MA, ensure that anchoring to the structure is of sufficient strength, quality and workmanship, to support the weight of the heater and any other loads such as snow.*

e) Connect heater to the main gas line. An approved 1/2" flexible connector (field supplied - available as an option from the manufacturer) must be used to absorb heater and gas line expansion and any vibration - check local code requirements.

f) Check gas line for leaks by using soap test or gas meter test. Ensure gas pressure meets the requirements outlined in Section 7.1 (above).

WARNING: *When testing the main gas line pressure up to 0.5 psig, ensure that the isolation valve and combination gas valve are "OFF", otherwise damage to the combination gas valve will result. When testing main gas line in excess of 0.5 psig the appliance and shut off valve must be disconnected or isolated from the gas supply piping system during any such pressure testing. Gas supply to the heater must be regulated to be maximum 0.5 psig (14”w.c.) and minimum values listed in Table 3 above in Section 7.1*

g) All wiring must adhere to local and national codes. The heater requires 24Vac power supply. The heater system zone requires a field supplied 120/24Vac transformer rated at 40VA for the first heater *plus* 20VA for each additional heater in the zone. Ensure proper electrical rating in the system by checking voltage at ignition module terminals. To avoid system malfunction, the voltage range must be within 10% of required 24Vac (21.6 Volts to 26.4 Volts), and correct polarity must be maintained throughout the system.

h) Test-fire the heating system by following the lighting instructions listed below and on the heater label.

10. LIGHTING INSTRUCTIONS

1. Ensure the correct voltage is supplied, gas supply lines have been properly purged, and gas valve is switched to the ON position.
2. Turn on power to heater, set thermostat (if applicable) to above ambient temperature, the heater will light.
3. If heater does not light: Turn off power to heater, turn gas valve to OFF position.
4. Wait for five minutes and repeat steps above. If heater does not light after three attempts, call a qualified service technician.

10.1 SHUT DOWN INSTRUCTIONS

a) For temporary shutdown, turn off the electrical circuit.

b) For complete shutdown, turn off the electrical circuit and turn gas control knob to the "OFF" position.

11. HEATER FINISH AND APPEARANCE

Exterior heater surfaces, including stainless steel components, are coated with a black high emissive coating that helps preserve the aesthetic appearance of the heater and improves the radiant heat output.

With extended use, the finish coat may discolor and deteriorate to some extent due to the impact of heat and the deposit of ambient air born particles. In some environments, the stainless steel lens cover may experience some surface oxidization and discoloration. These are normal occurrences caused by heat and products of combustion and in no way affect the operation and performance of the heater or the manufacturer's warranty.

OCCASIONAL FINISH MAINTENANCE:

Wear protective gloves, eyewear, and breathing mask. Ensure that power to the heater is disconnected prior to maintenance and the application of any finish coating. Use a fine steel wool to remove blemishes or unsightly deposit, and smooth the outer surface. The heater finish coat can be touched up using a high temperature coating such as Thurmalox Stove Paint - Flat Black-1200°F (650°C) or similar high temperature stove paint that is compatible with the original finish. **No other coating or non-high-temperature paint finish may be applied to the heater – use of an incompatible finish coating could create a hazardous condition such as fire or noxious fumes, damage the heater, and void the warranty.**

Apply the touch up finish with the heater in its operating orientation (facing down). Ensure that overspray does not effect the burner tile surface - insert a paper masking above the lens screen being coated. Remove the paper masking immediately after re-finish and prior to operation of the heater.

12. SERVICING GUIDE (Also refer to Troubleshooting Guide on page 27)

Servicing of heater is essential for continued efficient operation. Servicing should be carried out annually by a qualified gas service technician as follows:

- Clean the ceramic tiles with compressed air. Avoid directing air stream at gasket material between tile and heater body. The air pressure **must be lower than 20 psig.**
- Clean venturi tube with compressed air. The air pressure **must be lower than 20 psig**.
- Ensure gas orifice is clean and the heater cabinet is free of any debris

Indication of back firing:

- *Loud ignition noise, followed by distinct hissing sound.*
- *Little or no visible burning on the ceramic tile surface.*
- *Combustion is taking place inside the burner body.*

WARNING: *If heater backfires during operation, it **must** be turned off **immediately**.*

Cause & remedy of back firing:

- *Improper gas pressure entering the venturi tube: check pressure.*
- *Breakage of a ceramic tile and or gasketing: - replace damaged part.*
- *Faulty sealing of the ceramic tile to the burner body, caused by breakdown of gasket material: contact your local distributor or contractor.*

HEATER SERVICING POSITION:

WHEN USING WALL MOUNT BRACKET JP-2300-MB (see Figure 3 next page), the heater may need to be rotated 'up' so that access is provided to the service access door at the rear side of the heater that is against the wall.

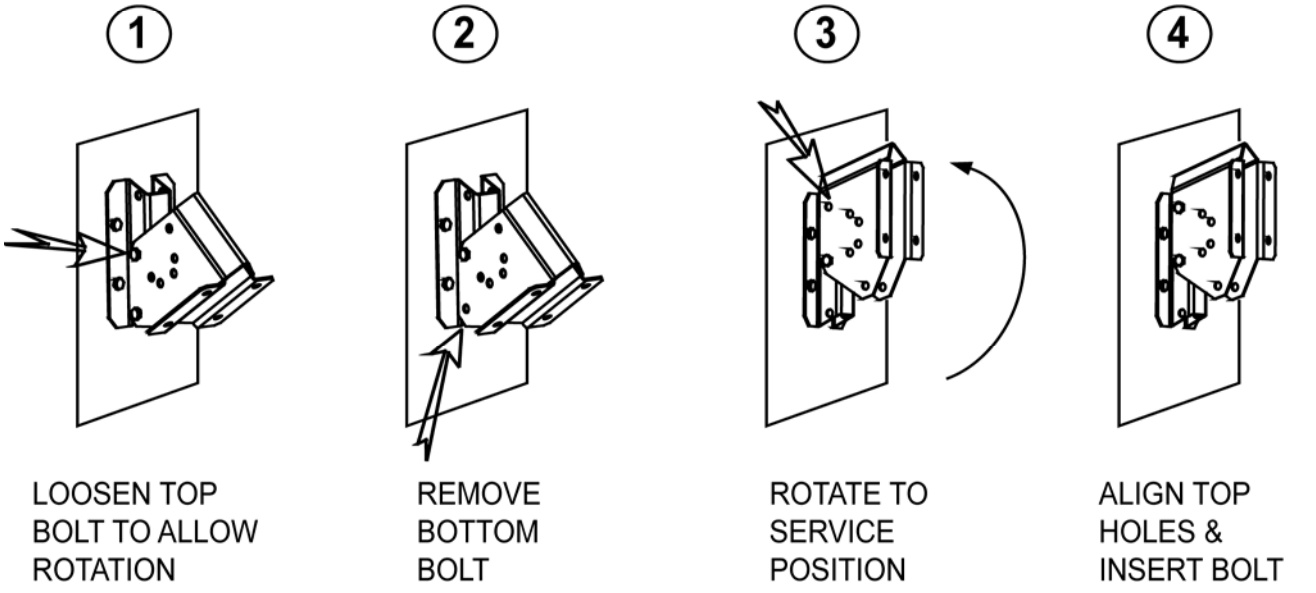
1. To allow rotation of the heater, slacken the upper bolt fastening the heater bracket to the wall mounting bracket .
2. Remove the lower bolt securing the two brackets and rotate the heater up to the service position.
3. Insert the bolt in the upper bracket hole to hold the heater for servicing, and apply locking nut to bolt for extra safety. Heater panel can now be accessed and serviced safely.
4. **NOTE: Do not start up the heater when in this upper service position as the gas valve is in a compromised position. Before starting the heater, ALWAYS restore the heater bracket back to its original plane and correct support position.**
5. To restore the heater to the operating position, lift and support the weight of the heater and remove nut and bolt from upper hole.
6. Slowly rotate the heater back down to the correct operating position.
7. Insert and fasten the bolt in the bottom hole, and secure with the nut.
8. At completion of service, ensure that both bracket support bolts are tightened securely.

Figure 3: HEATER SERVICE POSITION WITH WALL MOUNT BRACKET

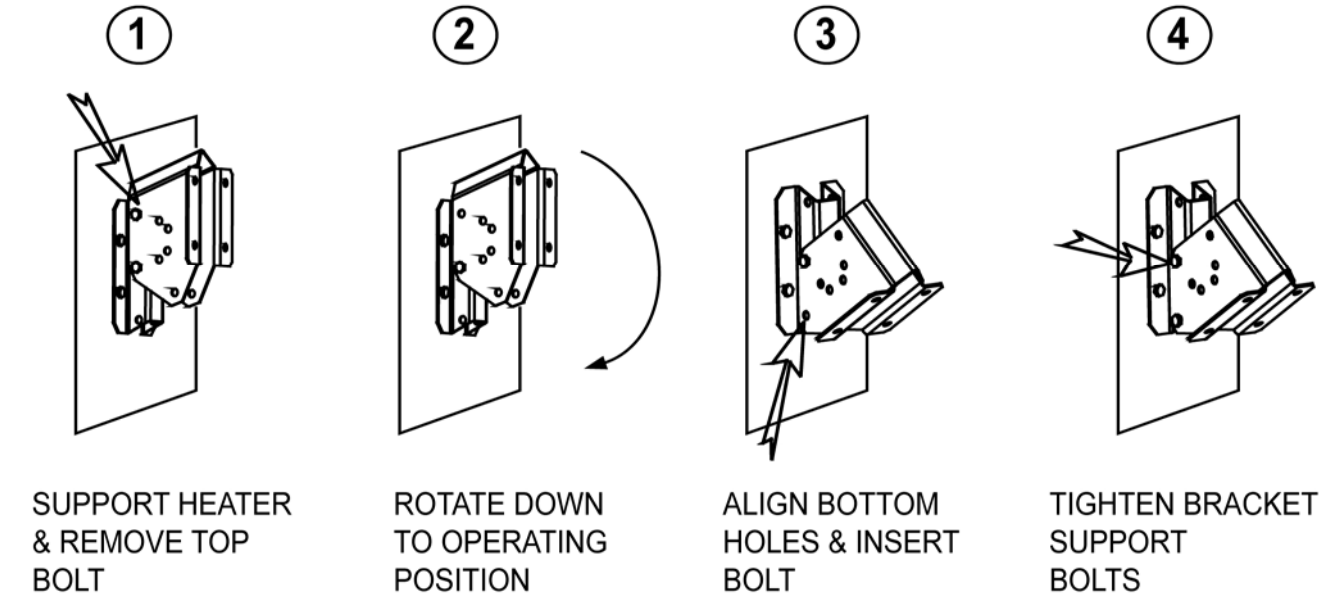
FOR SERVICING HEATER: (To simplify illustration the heater is not shown)

IT IS NOT NECESSARY TO REMOVE HEATER FROM SUPPORT BRACKET
DRAWINGS SHOW JUST THE BRACKET FOR BETTER VIEW

ROTATE TO SERVICE POSTITION



LOWER TO OPERATING POSITION



13. VENTILATION REQUIREMENTS FOR INDOOR APPLICATION

WARNING

Inadequate venting of a heater may result in asphyxiation, carbon monoxide poisoning, injury or death. Heating system venting must be in accordance with all local, state, provincial, and national codes (ANSI Z223.1/ NFPA 54 in USA; B149.1 in Canada).

This heater is approved for unvented (indirect venting) application. Ensure that there is adequate ventilation to supply combustion air and to dilute the products of combustion in accordance with all local, state, provincial, and national codes. A balanced exhaust / inlet air system is required to ensure that a negative air condition is not created. See below for a summary of exhaust capacity requirements by the national codes in the U.S.A. and Canada.

Air Supply: A “loose” building may not require any additional air supply if infiltration rates are sufficient to offset exhaust volume. However, for “tighter” buildings, or if air movement is stagnant in an area, air can typically be supplied via inlet(s) with an area of 1 sq. in. per 1,000 Btuh input (22 sq cm per kW). Locate air inlet(s) up at the level of the heaters to avoid cold drafts at work level, and effectively supply combustion and dilution air to the heaters and balance the system.

Heater Zoning: Exhausters are sized according to the input requirements of each controlled zone of heaters. Multiple smaller zones are usually more effective in both comfort and ventilation control than one large zone. Maximum zone size is limited by the total input that can be handled by the capacity of an exhauster, and by the proximity of the exhauster to heaters in the zone.

Exhauster Location & Proximity: Exhaust must be located as high as practicable in the structure above the level of the heater(s) to effectively dilute and remove the warm (rising) products of combustion. The exhauster should be as centrally located as practicable in the zone of heaters. Schwank recommends a maximum 6:1 ratio of the horizontal distance between the exhauster and the furthest heater in a zone, to the height the heaters are mounted above the floor . For example, if heaters are mounted 20 ft above the floor, then the exhaust fan should be located no more than 120 ft from the furthest heater in the zone. Sufficient air supply must be provided.

Exhauster Capacity:

USA: Natural or mechanical means shall be provided to supply and exhaust at least 4ft^3/min/1000Btuh (0.38m^3/min/kW) Natural Gas input of installed heaters [4.5ft^3/ min/1000Btuh (0..43m^3/min/kW) Propane input]. Some local codes may require an interlock to a dedicated exhaust fan. Consult your local code and ANSI Z223.1 latest edition for all venting requirements and practices.

Canada: It is required that the heater(s) be electrically interlocked to dedicated exhaust fan(s) by means of an Air Proving Switch. Exhaust fan(s) must be sized to create 300 cfm (8.5 cu m/min) exhaust for every 100,000 Btuh (30 kW) or any portion thereof of total input of installed equipment. Provide combustion and ventilation air supply compatible with exhaust volume . Consult the latest edition of CSA.B149.1 Section 7.22.

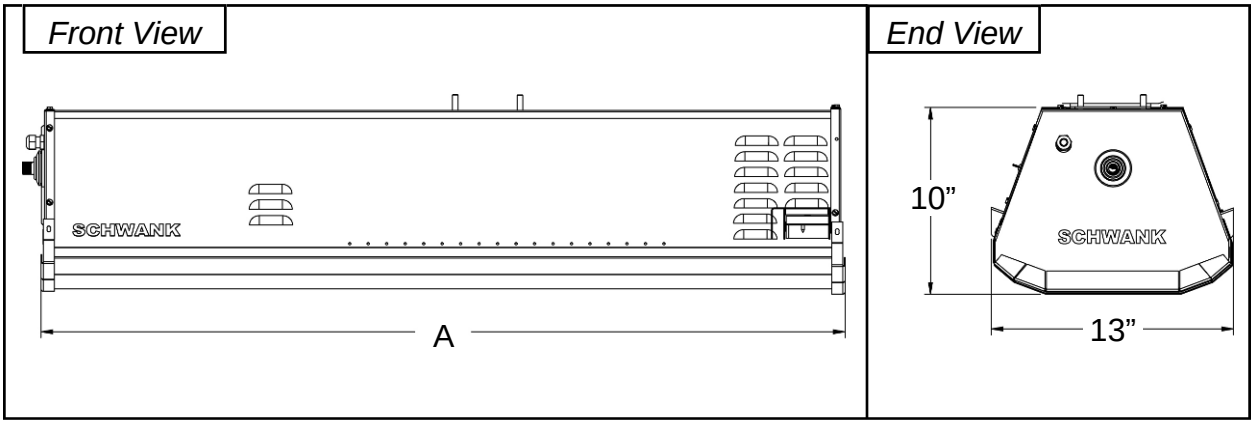
14. HEATER DIMENSIONS & CONFIGURATIONS

Table 4: CAPACITIES & CONFIGURATIONS

MODEL	Voltage VAC	Current amps	Btu/hr input	Total Weight (lbs).	Length < A >
2312 / IO 212 -NG	24	40 VA*	23,000	32	30 1/2”
2312 / IO 212 -LP			23,000	32	30 1/2”
2313 / IO 213 -NG			35,000	44	43 1/2”
2313 / IO 213 -LP			35,000	44	43 1/2”
2315 / IO 215 -LP			50,000	48	43 1/2”
2315 / IO 215 -NG			50,000	48	43 1/2”

* For a multiple heater installation, the first heater is sized at 40VA and each consecutive heater is sized at 20VA. The sum total will be the required Transformer size. If total VA exceeds one transformer size select the next higher VA rated transformer.

Figure 4: DIMENSIONS



15. MOUNTING KIT OPTIONS (NOTE: For unusual mounting application contact manufacturer.)

The heater is supplied with chain mounting bracket JP-2300-HS
Other optional mounting kits are available:

ITEM NO	PART NUMBER	DESCRIPTION
1	JP-2300-MB	WALL MOUNTING BRACKET
2	JP-2300-MA	ARM MOUNTING BRACKET
3	JP-2300-PC	POST BRACKET

WARNING: *Wall Mounting Bracket JP-2300-MB, or Arm Mounting Bracket JP-2300-MA: Ensure that anchoring to the structure is of sufficient strength, quality and workmanship, to adequately support the weight of the heater and any other loads such as snow build up.*

Figure 5: MOUNTING KIT OPTIONS

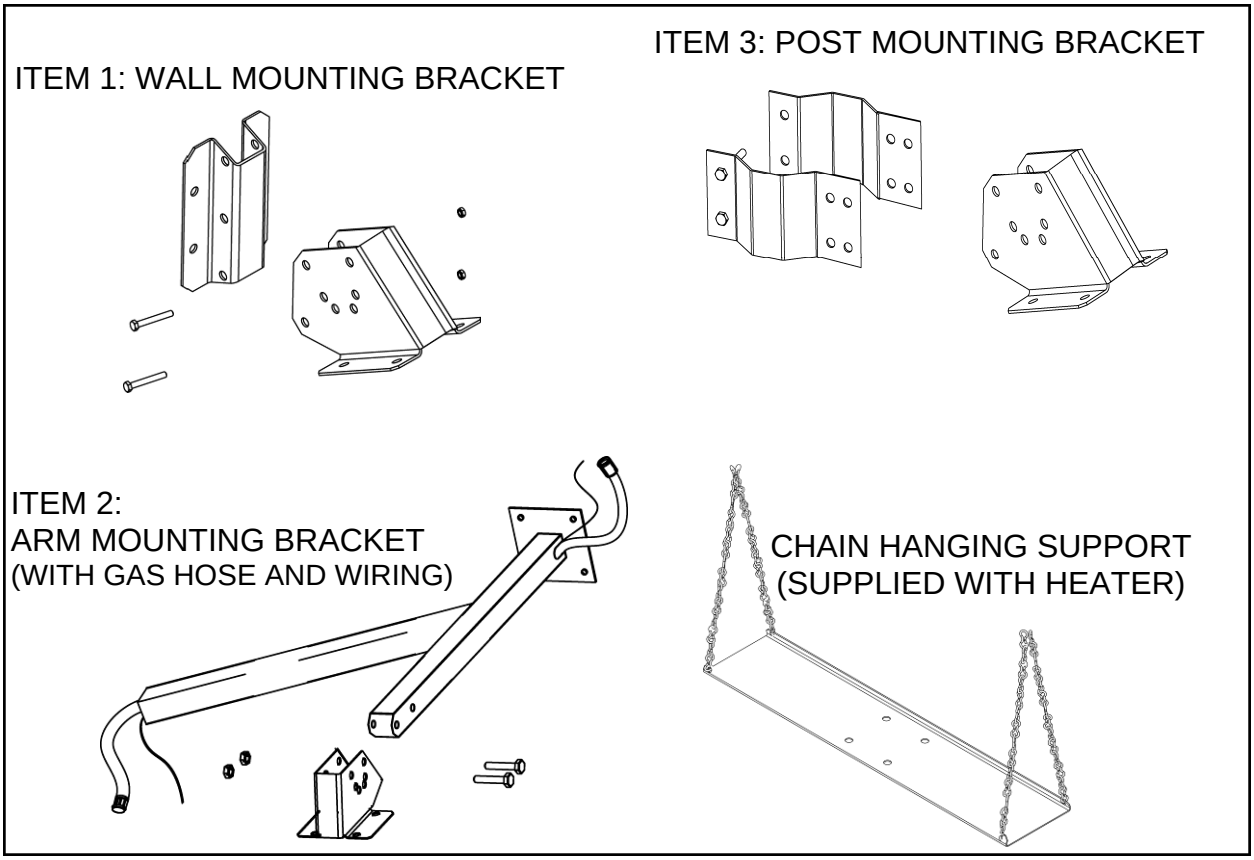


Figure 6: MOUNTING OPTIONS

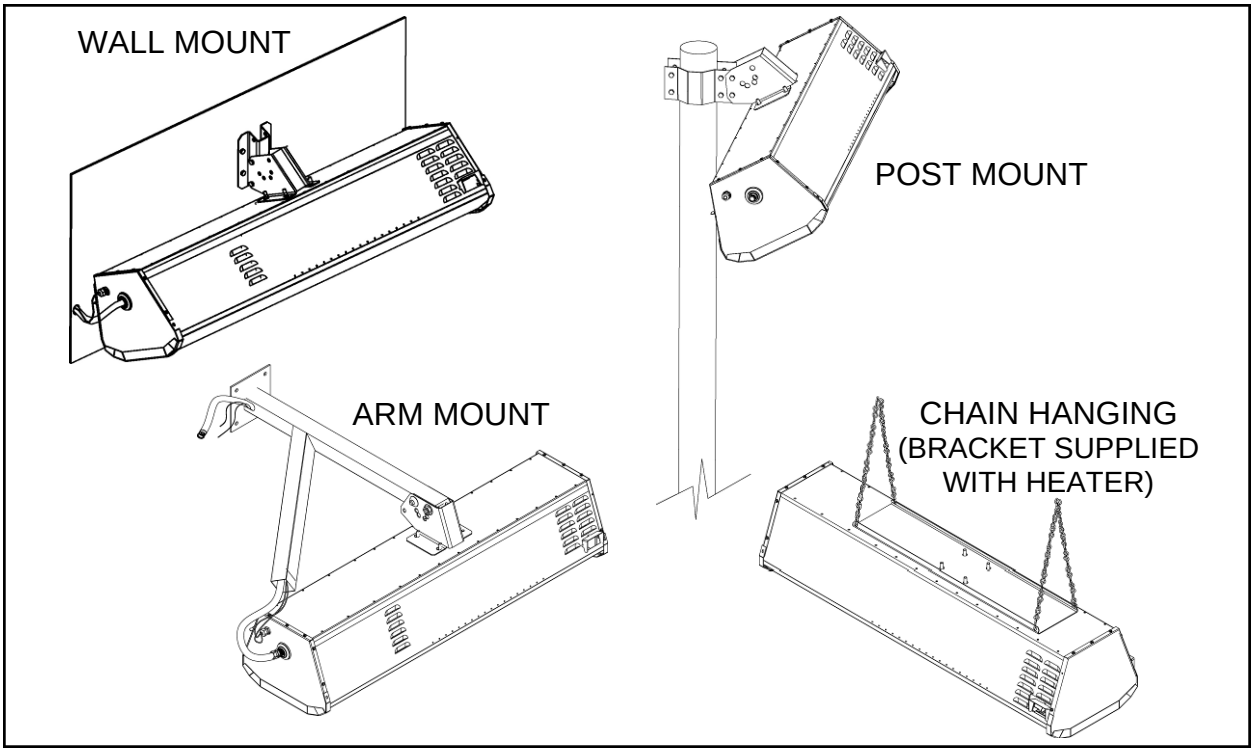


Figure 7: MOUNTING ARM WALL PLATE: TEMPLATE

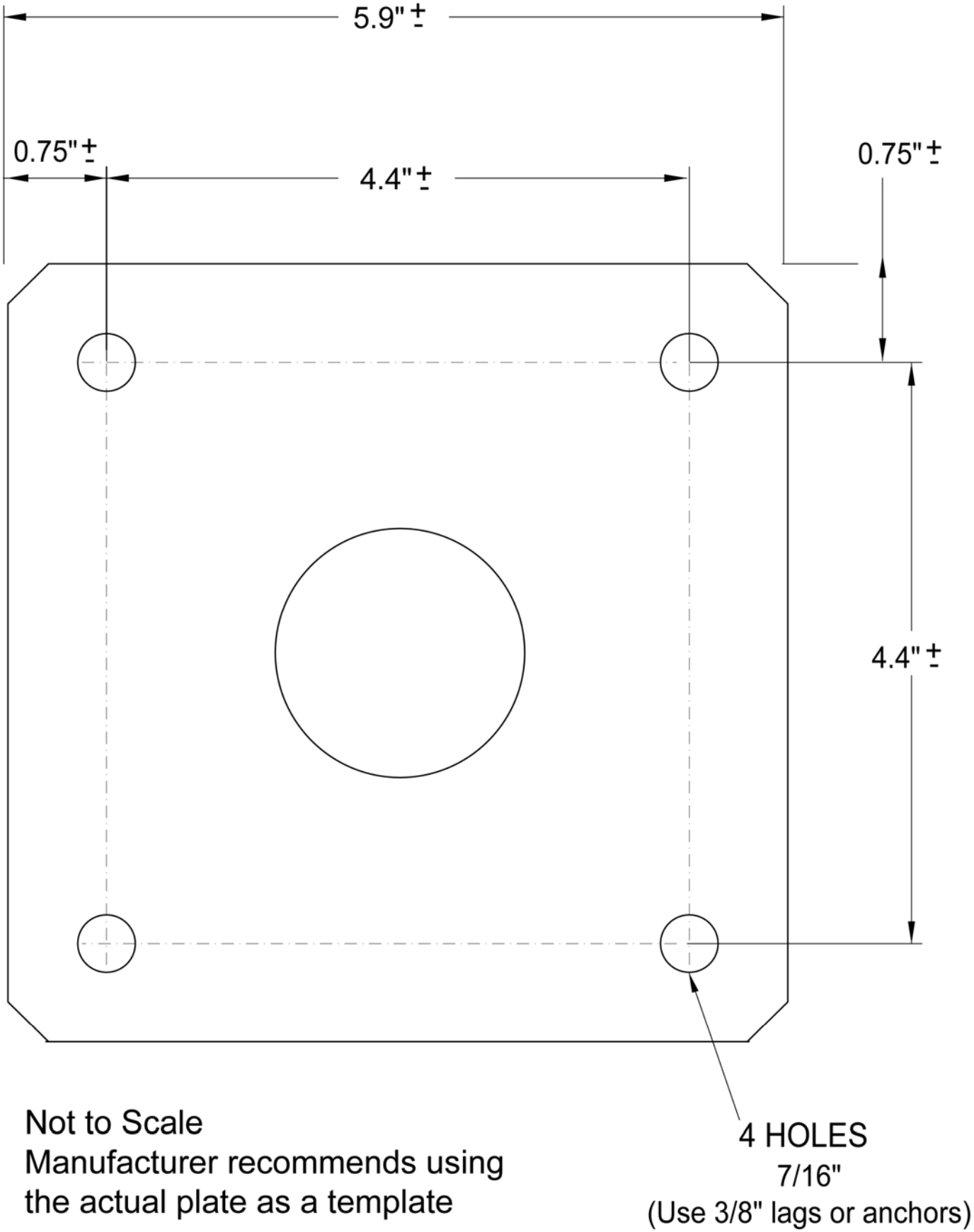
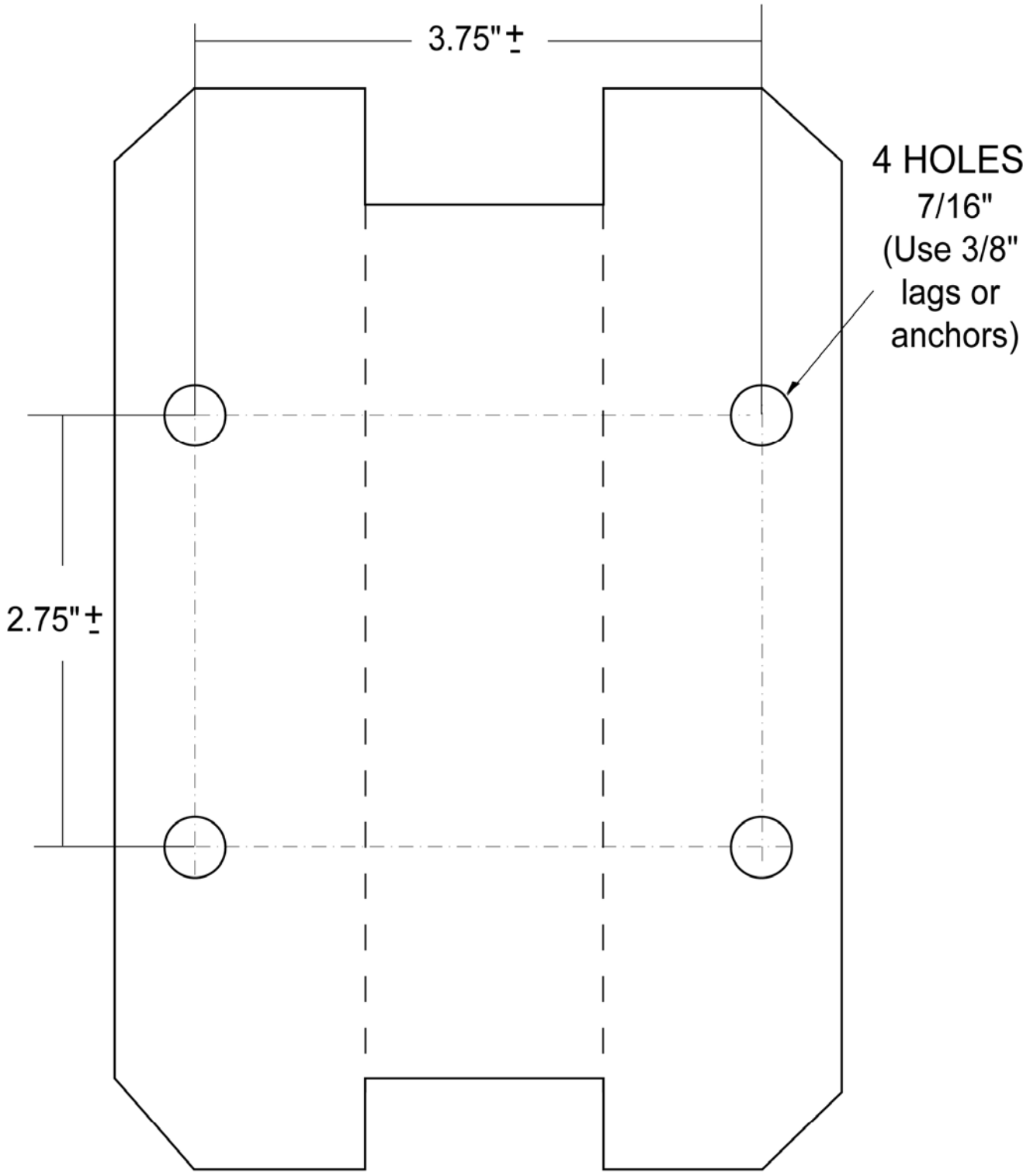
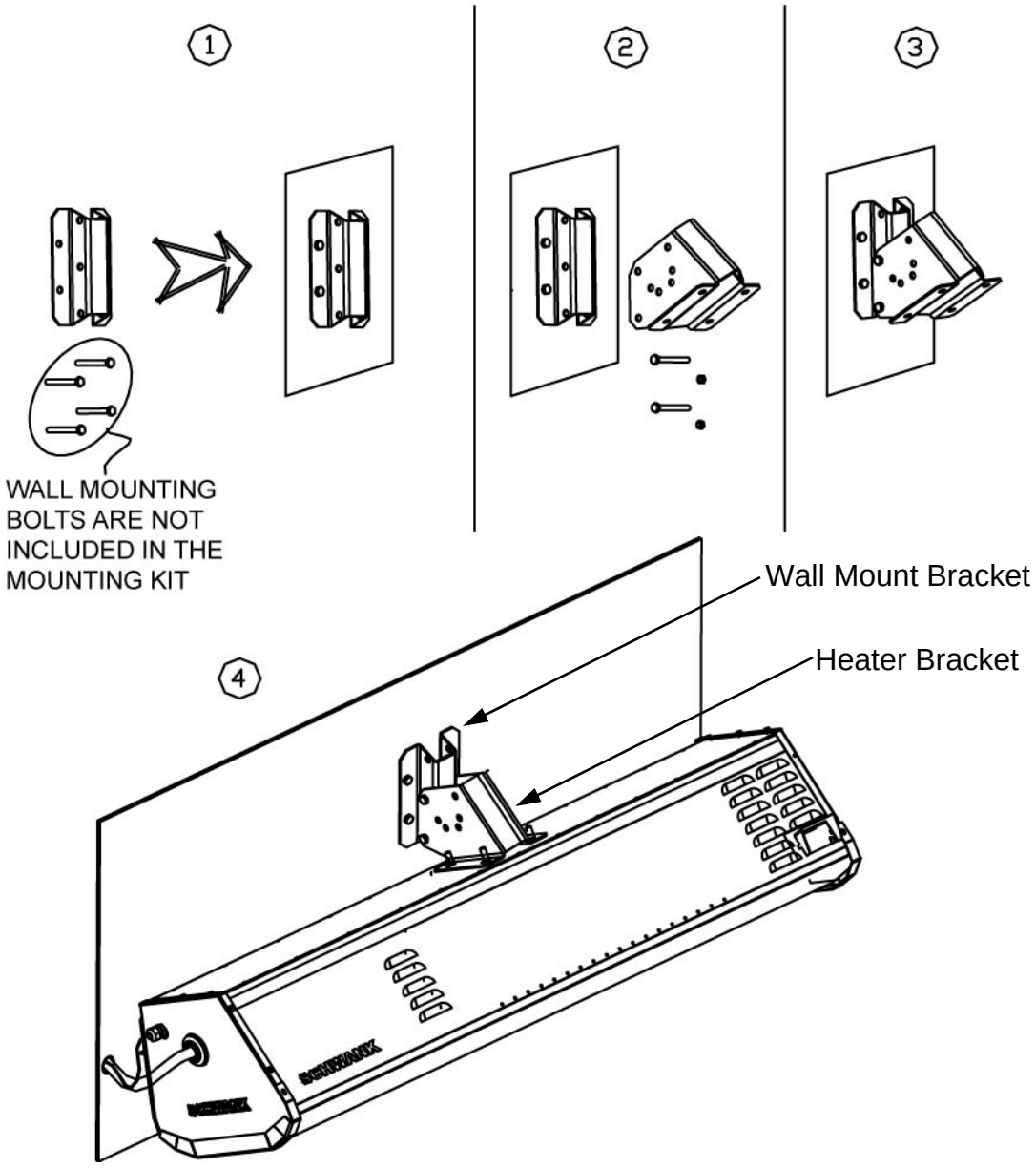


Figure 8: WALL MOUNT BRACKET: TEMPLATE



Not to Scale
Manufacturer recommends using
the actual plate as a template

Figure 9: HEATER INSTALLATION: WALL MOUNT BRACKET



1. Install the Wall Mount Bracket on the wall, using four bolts...(field supplied). See warning note (page 16) - ensure strength and integrity of mechanical fastening to structure
2. Install the heater bracket on the heater using four nuts.
3. Install the heater bracket to the wall mount bracket, and remove the chains from the top of the heater.

NOTE: The heater should be installed with enough 'slack' on the wiring and a flexible gas connector to allow the rotation of the heater up to the service position.
(See service position information on the next page).

16. ELECTRICAL REQUIREMENTS AND THERMOSTAT CONTROL

All electrical installations must meet local and the latest edition Electrical Code PART 1 CSA C22.1 in Canada and ANSI/NFPA N0 70 in the U.S.A.. Single heater requires 24 Volt, 60 Hz electrical transformer sized at 40VA. If multiple heaters are connected to a single transformer, the proper transformer is 24 Volt, 60 Hz, sized at 40VA for the first heater, and 20VA each for all subsequent additional heaters. For example, four heaters wired together (parallel), require a transformer of 100 VA. It is recommended to install at most 2 heaters per zone for best comfort control and economy of operation. PROPER WIRING POLARITY MUST BE MAINTAINED, particularly when grouping the heaters in a zone.
Total wiring distances of up to 200' must use minimum 16 gauge electrical wire, and wiring distances of over 200' must use minimum 14 gauge electrical wire. The heater must be electrically grounded in accordance with the local
electrical code. Malfunction of the heating system will result if the voltage varies by more than ±10%.
The heater can be controlled by a line moisture proof thermostat “off-on” switch, or Remote Control. Total load of all heaters must be considered in determining the required contact rating of the controlling thermostat or switch.

16.1 REMOTE CONTROL OPTION

Patio Heaters can be operated using Remote Control Option:

- JP-1234-RK Remote Receiver Kit (field installs in heater)
- JP-1234-HS Remote Handset
- Refer to the manual accompanying the Remote Receiver Kit for installation.

17. SEQUENCE OF OPERATION FOR FENWAL 35-60 DSI CONTROL

Start up - Heat Mode:

On a call for heat the Fenwal 35-60 control will reset, perform a self check routine, flash the diagnostic LED for up to four seconds. The gas valve and spark are energized commencing the trial for ignition period. When flame is detected during the trial for ignition, spark is shutoff immediately and the gas valve remains energized. The thermostat and main burner flame are constantly monitored to assure the system continues to operate properly. When the thermostat is satisfied and the demand for heat ends, the gas valve is de-energized.

Flame Failure - Multi Trial Model:

Should the main burner fail to light, or the flame is not detected during the first trial for ignition period, the gas valve is de-energized and the control goes through an interpurge delay before another ignition attempt. The control will attempt two additional ignition trials before going into lockout and the valve relay is de-energized.

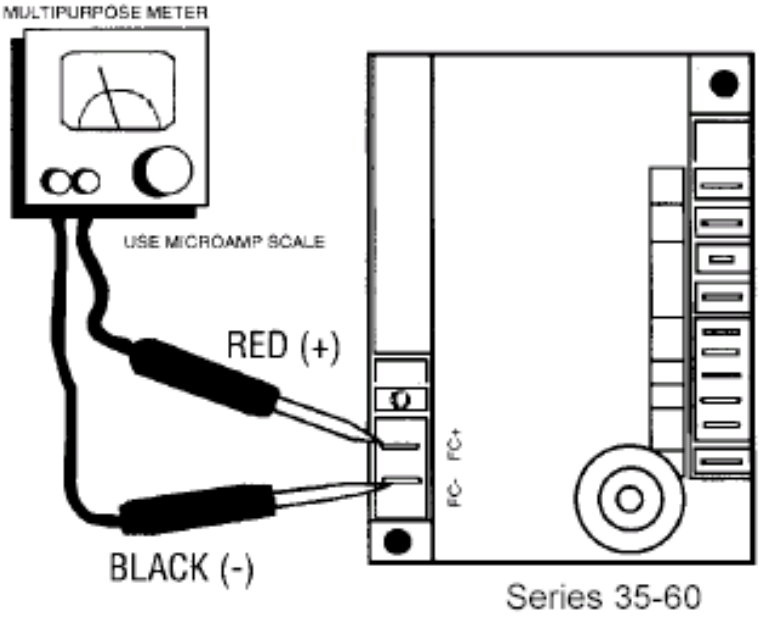
Recovery from lockout requires a manual reset by either resetting the thermostat or removing 24 volts for a period of 5 seconds. If the thermostat is still calling for heat after one hour the control will automatically reset and attempt to ignite the burner again.

Flame Failure - Re-Ignition:

If the established flame signal is lost while the burner is operating, the control will respond within 0.8 seconds. The HV spark will be energized for a trial ignition period in an attempt to relight the burner.

If the burner does not light the control will make two more attempts to relight the burner before de-energizing the gas valve. If the burner does not relight, the control will go into lockout as noted above in “Failure to light”. If flame is re-established, normal operation resumes. Multi-try models will allow three trials for ignition including interpurge delay between trials.

Flame current is the current which passes through the flame from the sensor to ground. The minimum flame current necessary to keep the Fenwal 35-60 system from lockout is 0.7 microamps (µA). To measure the flame current, connect analog DC microammeter to the FC-FC+ terminals.
Meter should read 0.7 µA or higher. If the meter reads below “0” on scale, meter leads are reversed. Disconnect power and reconnect meter leads for proper polarity.



Cautions:

3. Ceramic insulators should not be in or close to the flame.

2. Electrode assemblies should not be adjusted or disassembled. Electrodes should have a gap spacing of 1/8”- 3/16” (3.12± 0.81 mm). If this spacing is not correct, the assembly must be replaced. Electrodes are preset and NOT field adjustable.

3. Exceeding the temperature limits can cause nuisance lockouts and premature electrode failure.

The control must be secured in an area that will experience a minimum of vibration and remain below the maximum operating temperature of 160°F.

18. SPARK IGNITION CIRCUIT

The step-up transformer in the ignition control provides spark ignition at 30,000 volts (open circuit). To check the spark ignition circuit, proceed as follows.

1 Shut off gas supply to the gas control

2 Disconnect the ignition cable at the ignition control stud terminal to isolate the circuit from the spark igniter or igniter/sensor

3 Prepare a short jumper lead, using heavily insulated wire such as ignition cable

CAUTION

In the next step, DO NOT allow fingers to touch either the stripped end of the jumper or the stud terminal. This is a very high voltage circuit and electrical shock can result.

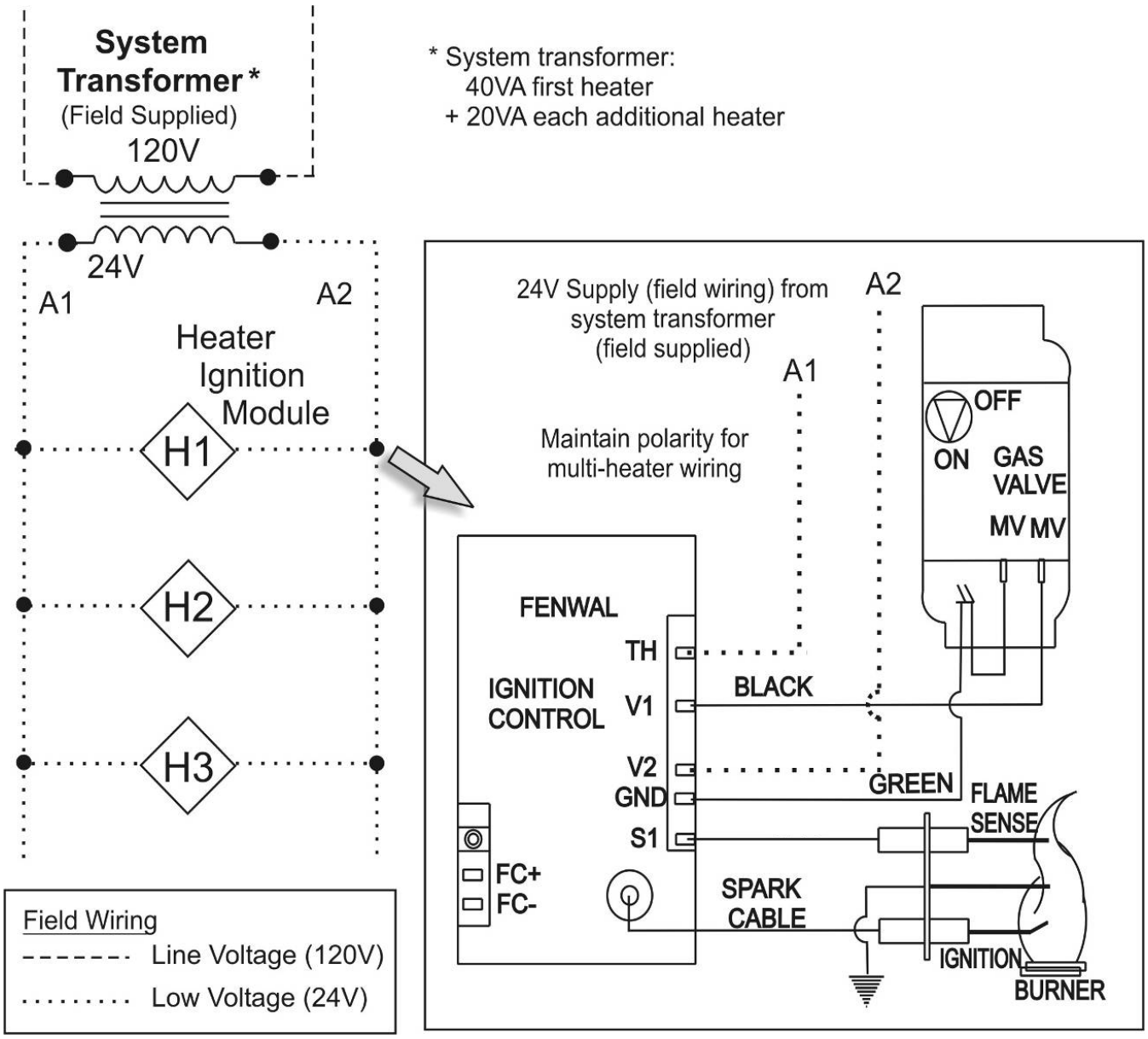
1 Perform this test immediately upon energizing the system before the ignition control goes into safety lockout and interrupts the spark circuit. Touch one end of the jumper firmly to the ignition control GND terminal. (DO NOT remove the existing ground lead.) Slowly move the other end of the jumper wire toward the stud terminal on the ignition control to establish a spark.

2 Pull the wire away from the stud and note the length of gap at which spark discontinues.

3 A spark length of 1/8 in. (3mm) or more indicates satisfactory voltage output. If no arc can be established, or the maximum spark is less than 1/8 in. (3mm), and power to the ignition control input terminals was proved, replace the ignition control.

19. WIRING DIAGRAM: 2300 / IO 210 with Fenwal 35-60 DSI Control

If installing remote control kit JP-1235-RK refer to wiring diagram in the remote control manual



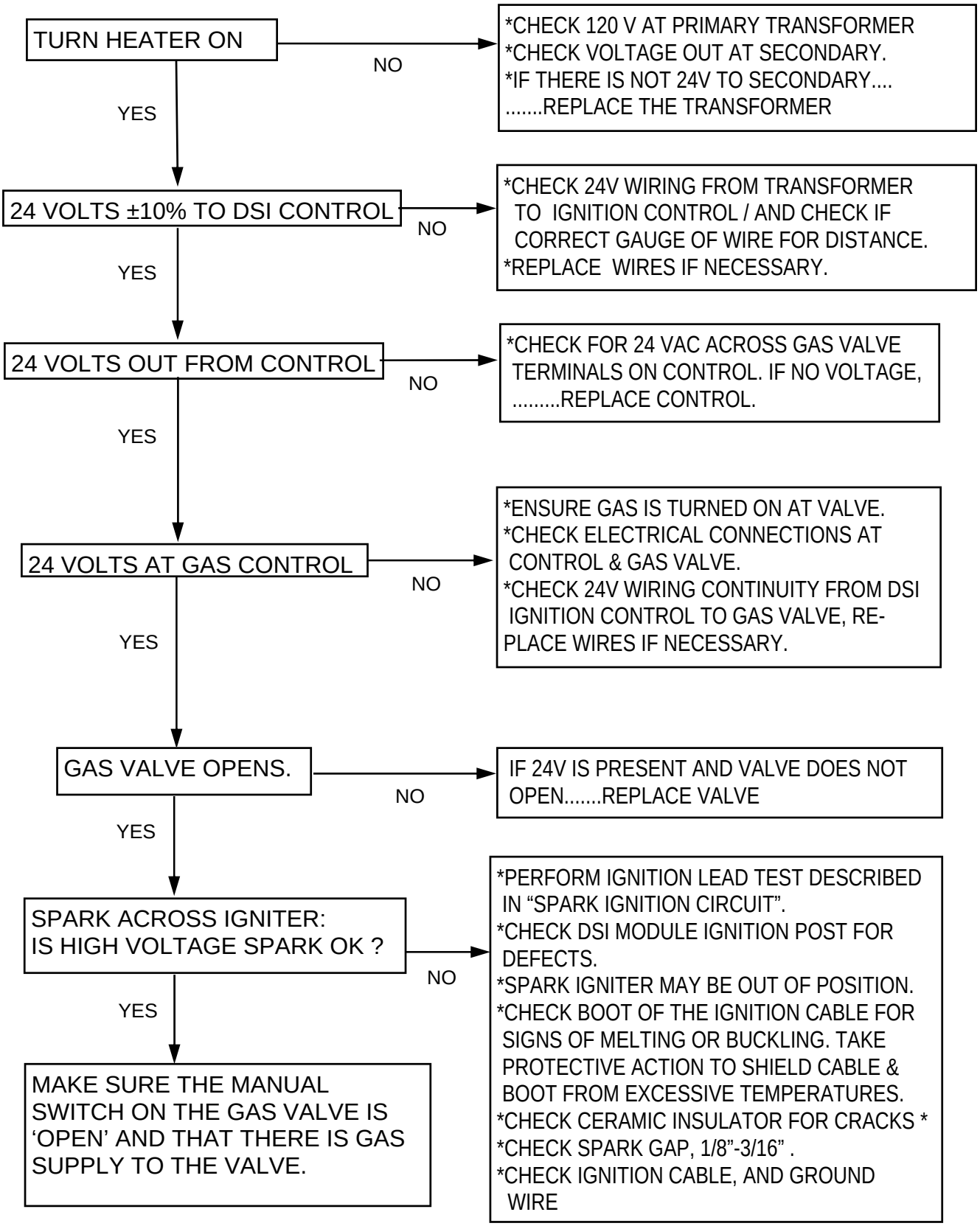
Fenwal Control Terminal Designation	
TH	Thermostat / 24V Supply Input
GND	System Ground
V1	Valve Power
V2	24V Supply Neutral
NC	Alarm
S1	Remote Flame Sensor

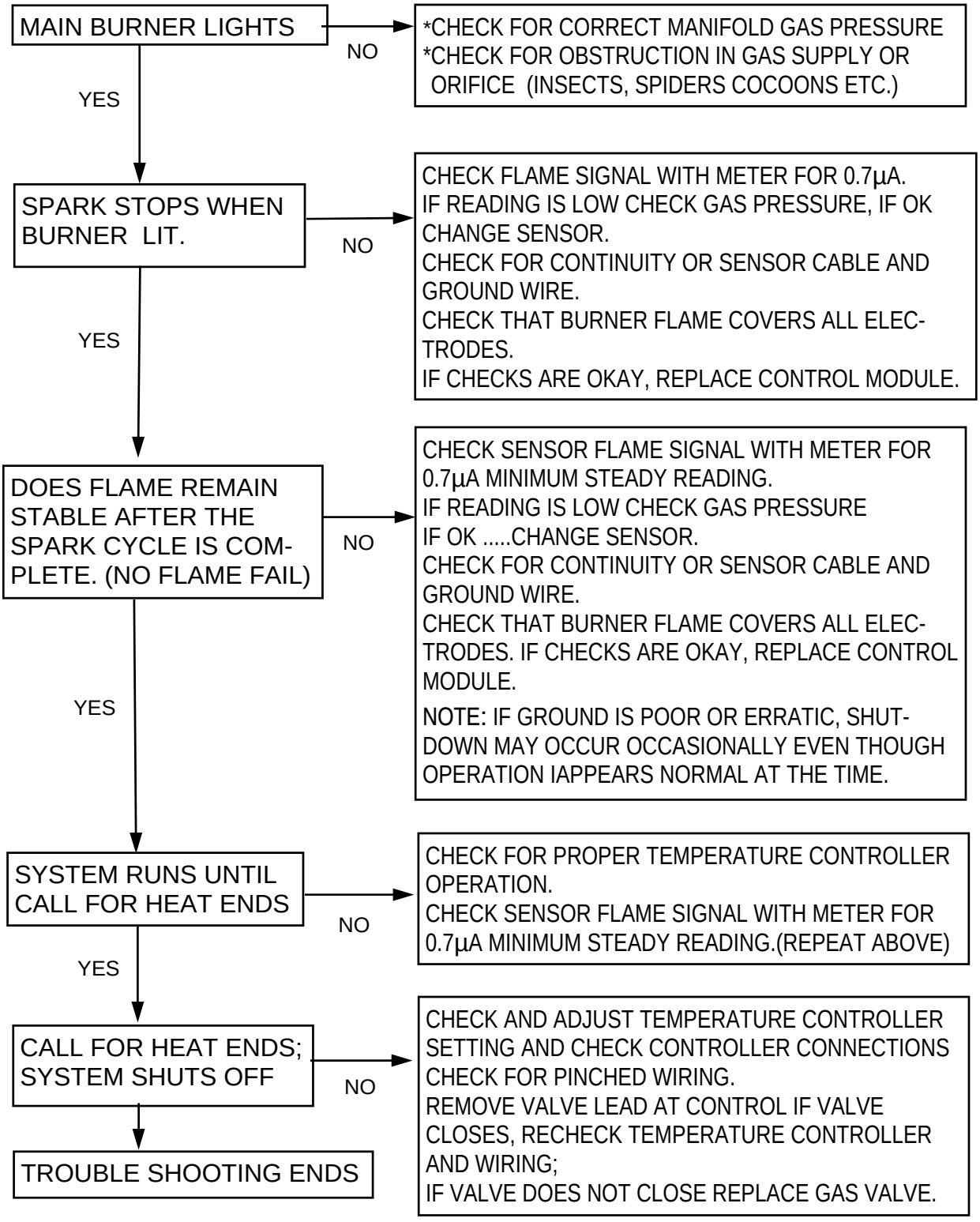
Error Mode	LED Indication
Internal Control Failure	Steady on
Flame with No Call for heat	2 flashes
Ignition Lockout	3 flashes

Fault Conditions:

The LED will flash on for 1/4 second, then off for 1/4 second during a fault condition. The pause between fault codes is 3 seconds.

20. TROUBLESHOOTING GUIDE


TURN HEATER ON
NO
*CHECK 120 V AT PRIMARY TRANSFORMER
*CHECK VOLTAGE OUT AT SECONDARY.
*IF THERE IS NOT 24V TO SECONDARY....
.....REPLACE THE TRANSFORMER
YES
24 VOLTS ±10% TO DSI CONTROL
NO
*CHECK 24V WIRING FROM TRANSFORMER TO IGNITION CONTROL / AND CHECK IF CORRECT GAUGE OF WIRE FOR DISTANCE.
*REPLACE WIRES IF NECESSARY.
YES
24 VOLTS OUT FROM CONTROL
NO
*CHECK FOR 24 VAC ACROSS GAS VALVE TERMINALS ON CONTROL. IF NO VOLTAGE,
.....REPLACE CONTROL.
YES
24 VOLTS AT GAS CONTROL
NO
*ENSURE GAS IS TURNED ON AT VALVE.
*CHECK ELECTRICAL CONNECTIONS AT CONTROL & GAS VALVE.
*CHECK 24V WIRING CONTINUITY FROM DSI IGNITION CONTROL TO GAS VALVE, RE-PLACE WIRES IF NECESSARY.
YES
GAS VALVE OPENS.
NO
IF 24V IS PRESENT AND VALVE DOES NOT OPEN.....REPLACE VALVE
YES
SPARK ACROSS IGNITER:
IS HIGH VOLTAGE SPARK OK ?
NO
*PERFORM IGNITION LEAD TEST DESCRIBED IN “SPARK IGNITION CIRCUIT”.
*CHECK DSI MODULE IGNITION POST FOR DEFECTS.
*SPARK IGNITER MAY BE OUT OF POSITION.
*CHECK BOOT OF THE IGNITION CABLE FOR SIGNS OF MELTING OR BUCKLING. TAKE PROTECTIVE ACTION TO SHIELD CABLE & BOOT FROM EXCESSIVE TEMPERATURES.
*CHECK CERAMIC INSULATOR FOR CRACKS *
*CHECK SPARK GAP, 1/8”-3/16” .
*CHECK IGNITION CABLE, AND GROUND WIRE
YES
MAKE SURE THE MANUAL SWITCH ON THE GAS VALVE IS ‘OPEN’ AND THAT THERE IS GAS SUPPLY TO THE VALVE.


MAIN BURNER LIGHTS
NO
*CHECK FOR CORRECT MANIFOLD GAS PRESSURE
*CHECK FOR OBSTRUCTION IN GAS SUPPLY OR ORIFICE (INSECTS, SPIDERS COCOONS ETC.)
YES
SPARK STOPS WHEN BURNER LIT.
NO
CHECK FLAME SIGNAL WITH METER FOR 0.7µA.
IF READING IS LOW CHECK GAS PRESSURE, IF OK CHANGE SENSOR.
CHECK FOR CONTINUITY OR SENSOR CABLE AND GROUND WIRE.
CHECK THAT BURNER FLAME COVERS ALL ELEC-TRODES.
IF CHECKS ARE OKAY, REPLACE CONTROL MODULE.
YES
DOES FLAME REMAIN STABLE AFTER THE SPARK CYCLE IS COM-PLETE. (NO FLAME FAIL)
NO
CHECK SENSOR FLAME SIGNAL WITH METER FOR 0.7µA MINIMUM STEADY READING.
IF READING IS LOW CHECK GAS PRESSURE
IF OK .....CHANGE SENSOR.
CHECK FOR CONTINUITY OR SENSOR CABLE AND GROUND WIRE.
CHECK THAT BURNER FLAME COVERS ALL ELEC-TRODES. IF CHECKS ARE OKAY, REPLACE CONTROL MODULE.
NOTE: IF GROUND IS POOR OR ERRATIC, SHUT-DOWN MAY OCCUR OCCASIONALLY EVEN THOUGH OPERATION IAPPEARS NORMAL AT THE TIME.
YES
SYSTEM RUNS UNTIL CALL FOR HEAT ENDS
NO
CHECK FOR PROPER TEMPERATURE CONTROLLER OPERATION.
CHECK SENSOR FLAME SIGNAL WITH METER FOR 0.7µA MINIMUM STEADY READING.(REPEAT ABOVE)
YES
CALL FOR HEAT ENDS; SYSTEM SHUTS OFF
NO
CHECK AND ADJUST TEMPERATURE CONTROLLER SETTING AND CHECK CONTROLLER CONNECTIONS
CHECK FOR PINCHED WIRING.
REMOVE VALVE LEAD AT CONTROL IF VALVE CLOSES, RECHECK TEMPERATURE CONTROLLER AND WIRING;
IF VALVE DOES NOT CLOSE REPLACE GAS VALVE.
TROUBLE SHOOTING ENDS

NOTE: IF CONTROL GOES INTO LOCKOUT, THE SYSTEM CAN BE RESET BY INTERRUPTING THE POWER SOURCE

21. COMMISSIONING REPORT

This heater has been factory fired and tested prior to shipment. However, it is not a 'Plug-in' appliance. **Commissioning and field adjustment to correct settings is required.**

COMPLETE THIS COMMISSIONING REPORT AND
FILE THIS MANUAL AT SITE FOR FUTURE REFERENCE

INSTRUCT THE END USER THAT THIS MANUAL MUST BE KEPT SECURE

A QUALIFIED SERVICE TECHNICIAN CALLING FOR TECHNICAL SUPPORT
***MUST* PROVIDE THE INFORMATION FROM THE**
COMPLETED COMMISSIONING REPORT

TECHNICAL SUPPORT: 1-877-446-3727
BUSINESS HOURS: 8:30 a.m. to 5:00 p.m. Eastern time

COMMISSIONING REPORT
AS PER I&O MANUAL AND LOCAL CODES

CONTRACTOR NAME: .....DATE.....

ADDRESS:.....

.....

CITY:.....

PHONE:.....

CELL: .....

JOB SITE.....CITY.....

HEATER MODEL NUMBER:.....

HEATER SERIAL NUMBER: .....

Technical commissioning report continues next page ….

HEATER COMMISSIONING TECHNICAL REPORT

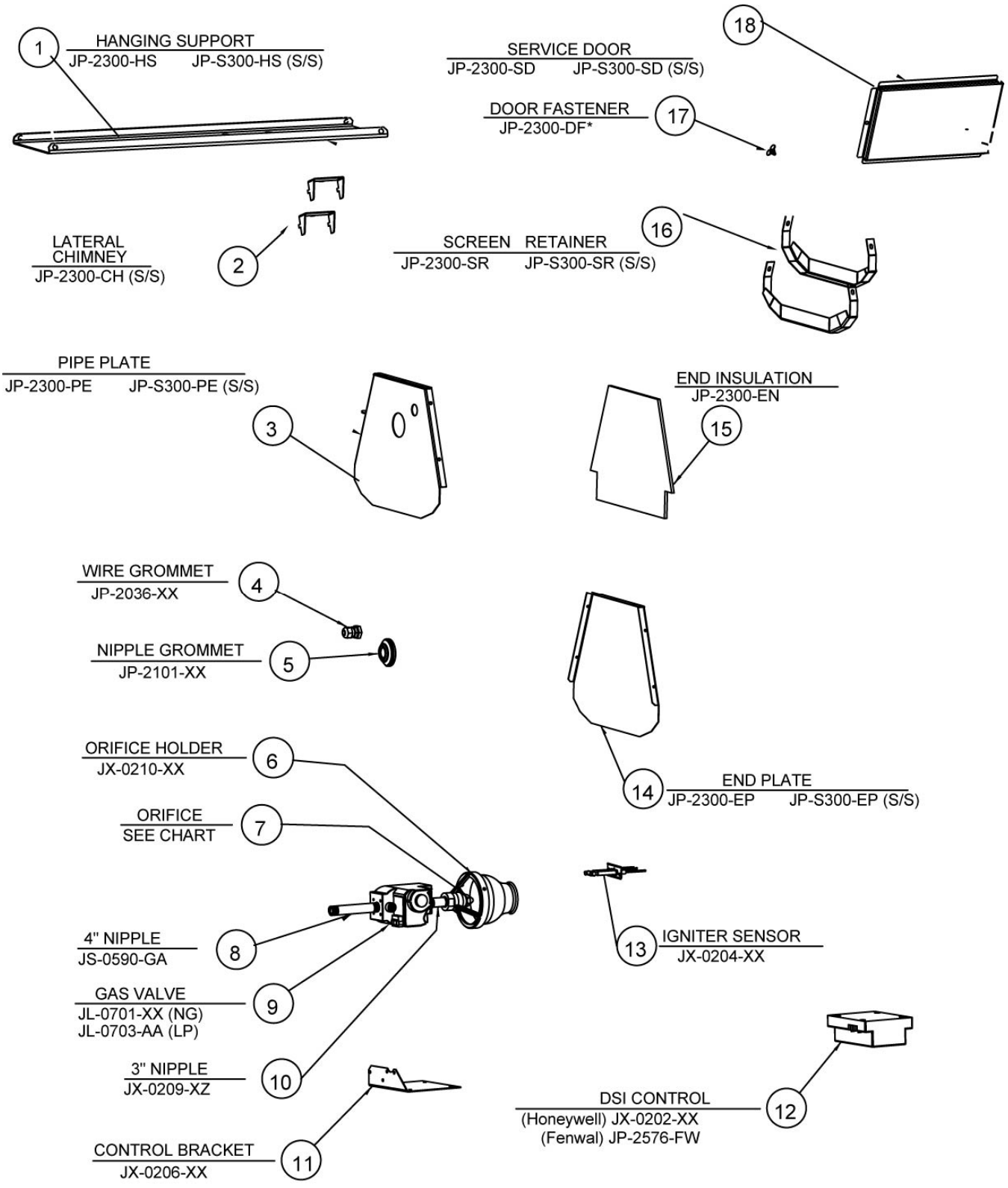
TO BE COMPLETED BY QUALIFIED GAS FITTER INSTALLER

TYPE OF GAS:	NG ☐	LP ☐
IS HEATER EXPOSED TO CHEMICAL OR CORROSIVE ATMOSPHERE:	YES ☐	NO ☐
IS AN OPEN FLAME COMPATIBLE WITH THE INSTALLED LOCATION:	YES ☐	NO ☐
MINIMUM CLEARANCES CONFORM AS PER I&O MANUAL:	YES ☐	NO ☐
IF THIS IS A HIGH ALTITUDE AREA WHAT IS THE ALTITUDE ABOVE SEA LEVEL		☐ Feet
IS HEATER SHORT AXIS HORIZONTAL WITH THE VENTURI ON TOP:	YES ☐	NO ☐
IS GAS SUPPLY LINE ADEQUATELY SIZED FOR SYSTEM VOLUME:	YES ☐	NO ☐
HAVE GAS LINES AND BRANCHES BEEN PURGED OF AIR:	YES ☐	NO ☐
THIS HEATER WAS FIELD TEST FIRED WITHOUT ANY MALFUNCTION:	YES ☐	NO ☐
INLET GAS SUPPLY PRESSURE WITH HEATER OPERATING:	☐	WC"
GAS VALVE OUTLET (Manifold) PRESSURE WITH HEATER OPERATING:	☐	WC"
HAS THE WIRING POLARITY BEEN MAINTAINED THROUGHOUT:	YES ☐	NO ☐
WHAT IS THE VOLTAGE READING AT THE IGNITION MODULE:	☐	VOLTS
WHAT IS THE FLAME SIGNAL STRENGTH IN uA FROM SENSOR:	☐	uA (microamps)
IS THE HEATER CONTROLLED BY A THERMOSTAT:	YES ☐	NO ☐
IS THE THERMOSTAT STRATEGICALY LOCATED:	YES ☐	NO ☐
TOTAL HEATERS SUPPLIED FROM ONE SINGLE TRANSFORMER:	☐	TOTAL
WHAT IS THE RATING OF THE TRANSFORMER IN VA:	☐	V.A.
WHAT IS THE TOTAL LENGTH OF THE LOW VOLTAGE WIRING:	☐	FEET
WHAT IS THE GAUGE OF THE LOW VOLTAGE WIRING:	☐	GAUGE
DOES THE HEATER HAVE GOOD ELECTRICAL GROUNDING:	YES ☐	NO ☐

- **COMPLETE THIS COMMISSIONING REPORT AND FILE THIS MANUAL AT SITE FOR FUTURE REFERENCE**
- **INSTRUCT THE END USER THAT THIS MANUAL MUST BE KEPT SECURE**
- **A QUALIFIED SERVICE TECHNICIAN CALLING FOR TECHNICAL SUPPORT *MUST* PROVIDE THE INFORMATION FROM THE COMPLETED COMMISSIONING REPORT**

22. Replacement Parts List

Only the following illustrated parts are available. For any other parts please contact the manufacturer.



Schwank
INNOVATIVE HEATING SOLUTIONS

LIMITED WARRANTY CERTIFICATE

infrasave
radiant heaters

GAS-FIRED INFRA-RED PATIO HEATERS : 2300 / IO 210 SERIES

The Manufacturer warrants that this product is free from defects in material or workmanship under normal use and service subject to the terms of this document.

ONE YEAR WARRANTY

Subject to the conditions and limitations stated herein, during the term of this limited warranty, we will supply any component part (at our option a new or repaired component part) of the heater, as defined below, excluding any labor, which the Manufacturer's examination determines to be defective in workmanship or material for a period of one year (1 year) from the date of installation, unless otherwise specified below. This warranty applies to the heater's original owner, and subsequent transferees and only if the unit is installed and operated in accordance with the printed instructions accompanying the unit and in compliance with all applicable installation, building codes and good trade practices.

BURNER AND CERAMIC TILE - THREE YEAR WARRANTY

The manufacturer warrants the burner and ceramic tile for a period of three years. (3 years)

WHAT IS NOT COVERED

The Manufacturer shall not be responsible for any expenses, including service, labor, diagnosis, analysis, material or transportation charges incurred during removal or reinstallation of this product, or any of its components or parts. All labor or service charges shall be paid by the owner. This warranty does not cover heating products improperly installed, misused, exposed to or damaged by negligence, accident, corrosive or contaminating atmosphere, water, excessive thermal shock, impact, abrasion, normal wear due to use, alteration or operation contrary to the owner's manual or if the serial number has been altered, defaced or removed. This warranty shall not apply if the input to the heating product exceeds by more than 2% of the rated input on the rating plate. The Manufacturer shall not be liable for any default or delay in performance by its warranty caused by any contingency beyond its control, including war, government restrictions, or restraints, strikes, fire, flood, acts of God, or short or reduced supply of raw materials or products.

WARRANTY PROCEDURE

To establish the installation date for any purpose under this Limited Warranty, you must retain the original records that can establish the installation date of your unit. If you do not provide such documents, the start date of the term of this Limited Warranty will be based upon the date of unit manufacture, plus thirty (30) days. Failure to maintain the equipment through regular annual service maintenance by a qualified service technician shall void the warranty.

LIMITATIONS AND EXCLUSIONS

This document contains all warranties made by the Manufacturer and may not be varied, altered or extended by any person. There are no promises, or agreements extending from the Manufacture other than the statements contained herein. THIS WARRANTY IS IN LIEU OF ALL WARRANTIES EXPRESSED OR IMPLIED, TO THE EXTENT AUTHORIZED BY THE LAWS OF THE JURISDICTION, INCLUDING SPECIFICALLY THE WARRANTIES OR MERCHANTIBILITY OF FITNESS FOR A PARTICULAR PURPOSE.

It is understood and agreed that the Manufacturer's obligation hereunder is limited to repairing or replacing parts determined to be defective as stated above. In no event shall the Manufacturer be responsible for any alleged personal injuries or other special, incidental or consequential damages. As to property damages, contract, tort or other claim the Manufacturer's responsibility shall not exceed the purchase priced paid for the product.

All replacement parts will be warranted for the unused portion of the warranty coverage period remaining on the applicable unit.

Some Authorities do not allow certain warranty exclusions or limitations on how long a warranty lasts or the exclusions or limitations of incidental or consequential damages. In such cases, the above limitations or exclusions may not apply to you and are not intended to do so where prohibited by law. This warranty gives you specific legal rights. You may also have other rights which vary by each jurisdiction.

5285 BRADCO BLVD. MISSISSAUGA, ON, L4W 2A6
2 SCHWANK WAY, WAYNESBORO, GEORGIA. 30830-8336

SCHWANK **Ph: 905-712-4766 Fax: 905-712-8336**
INFRASAVE **Ph: 1-866– INFRASV (463 7278) Fax: 1-866-724 –9265**

GP-D230-BX-03B
2300 / IO 210 WARRANTY
March 2006
RL: 3B
KH